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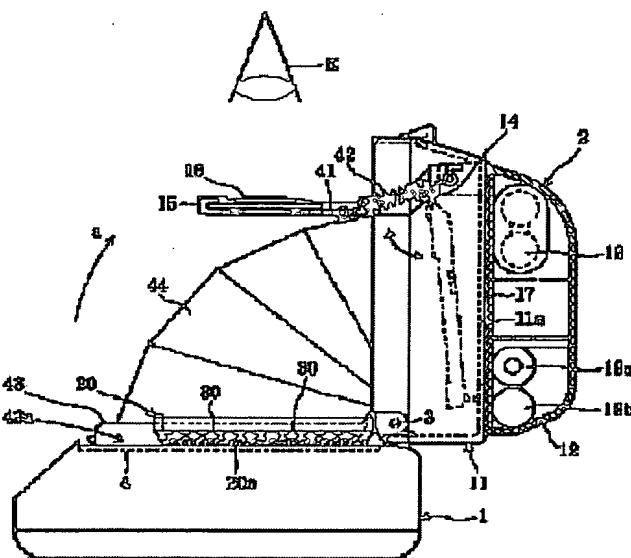
CEREAL GRAIN OBSERVING APPARATUS

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Abstract of JP11142341

PROBLEM TO BE SOLVED: To provide a cereal grain observing apparatus observing not only grains of rice such as unhulled rice, cleaned rice or the like but also grains of cereals not permitting the transmission of light such as unhulled rice, beans or the like to judge the quality thereof.

SOLUTION: For example, a cereal grain observing apparatus has a sample tray 20 equipped with a transparent bottom plate 20a on which grains 30 of rice are placed, an apparatus main body 1 having a transparent window part 4 on which the sample tray 20 is placed provided in the upper part thereof, the fluorescent lamp 6 arranged in the apparatus main body 1 and irradiating the grains 30 of rice with transmitting lower illumination light through the transparent window part 4 and the transparent bottom plate 20a of the sample tray 20 and the lid body 2 applied so as to be capable of opening and closing the sample tray 20 on the transparent window part 4 in the apparatus main body 1 and having an upper fluorescent lamp 18 irradiating the grains 30 of rice on the sample tray 20 with reflecting upper illumination light provided therein.



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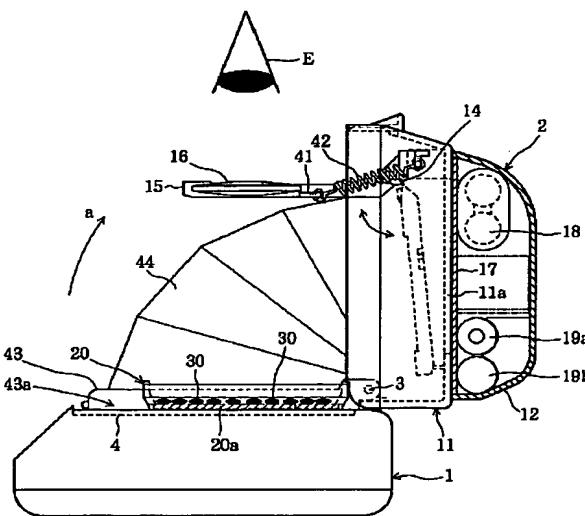
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(54) 【発明の名称】穀類粒観察装置

(57) 【要約】

【課題】本発明は、玄米や精米等の米粒の観察は勿論、粉類、豆類等のように光が透過しない穀類粒をも観察し、その良否を判定できる穀類粒観察装置を提供する。

【解決手段】本発明の穀類粒観察装置は、例えば米粒30を載置する透明底板20aを備えた試料皿20と、この試料皿20を載置する透明窓部4を上部に備えた装置本体1と、この装置本体1内に配置され、前記透明窓部4、前記試料皿20の透明底板20aを介して前記米粒30に対し透過用の下部照明光を照射する蛍光灯6と、前記装置本体1における透明窓部4上の試料皿20を開閉可能に施蓋するとともに、内部に前記試料皿20上の米粒30に対して反射用の上部照明光を照射する上部蛍光灯18を備えた蓋体2とを有することを特徴とする。



【特許請求の範囲】

【請求項1】穀類粒を載置する透明底板を備えた試料皿と、この試料皿を載置する透明窓部を上部に備えた装置本体と、この装置本体内に配置され、前記透明窓部、前記試料皿の透明底板を介して前記穀類粒に対し透過用の下部照明光を照射する下部照明手段と、前記装置本体における透明窓部上の試料皿を表出又は包覆可能で、且つ、装置本体を開閉可能に施蓋するとともに、内部に前記試料皿上の穀類粒に対して反射用の上部照明光を照射する上部照明手段を備えた蓋体と、を有することを特徴とする穀類粒観察装置。

【請求項2】穀類粒を載置する透明底板を備えた試料皿と、この試料皿を載置する透明窓部を上部に備えた装置本体と、この装置本体内に配置され、前記透明窓部、前記試料皿の透明底板を介して前記穀類粒に対し透過用の下部照明光を照射する下部照明手段と、前記装置本体における透明窓部上の試料皿を表出又は包覆可能で、且つ、装置本体を開閉可能に施蓋するとともに、内部に前記試料皿上の穀類粒に対して反射用の上部照明光を照射する上部照明手段を備えた蓋体と、前記蓋体内において、この蓋体の開蓋状態で前記試料皿上の穀類粒の上方に展開可能に配置した拡大光学手段と、を有することを特徴とする穀類粒観察装置。

【請求項3】前記下部照明手段による下部照明光、前記上部照明手段による上部照明光を、いずれか一方のみ又は双方同時に、前記試料皿上の穀類粒に照射可能としたことを特徴とする請求項1又は2記載の穀類粒観察装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、穀類粒観察装置に関し、特に米粒等の穀類粒に光を透光して穀類粒内に見られる暗影から胴割れ等を検出可能とした穀類粒観察装置に関する。

【0002】

【従来の技術】米粒等の穀類粒の胴割れは、穀類の品質を低下する要因であり、胴割れした穀類粒を発見し、排除することが要請される。このため、従来においても多数の透孔部に穀類粒を配置して光を透過させ、穀類粒内の暗影の有無を検査して胴割れした穀類粒を発見する方法が採用されている。

【0003】

【発明が解決しようとする課題】しかしながら、上述した従来例の場合には、穀類粒の透過光を観察するものであるために、例えば、粉類、豆類等のように光が透過し

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ない穀類粒の状態を観察することはできなかった。そこで、本発明は、玄米や精米等の米粒を観察できることは勿論、粉類、豆類等のように光が透過しない穀類粒をも観察可能でその良否を判定でき、屋外でも簡単に使用できる穀類粒観察装置を提供することを目的とするものである。

【0004】

【課題を解決するための手段】請求項1記載の発明に係る穀類粒観察装置は、穀類粒を載置する透明底板を備えた試料皿と、この試料皿を載置する透明窓部を上部に備えた装置本体と、この装置本体内に配置され、前記透明窓部、前記試料皿の透明底板を介して前記穀類粒に対し透過用の下部照明光を照射する下部照明手段と、前記装置本体における透明窓部上の試料皿を表出又は包覆可能で、且つ、装置本体を開閉可能に施蓋するとともに、内部に前記試料皿上の穀類粒に対して反射用の上部照明光を照射する上部照明手段を備えた蓋体とを有することを特徴とするものである。この発明によれば、試料皿上の穀類粒に対し、透過用の下部照明光を照射する下部照明手段とともに、前記穀類粒に対し反射用の上部照明光を照射する上部照明手段を備えているので、下部照明手段を使用しての例えば米粒等からの透過光の観察と、上部照明手段を使用しての米粒等からの透過光の観察との双方を実行でき、米粒は勿論、粉類、豆類等のように光が透過しない穀類粒をも観察しその良否を判定することができる。請求項2記載の発明に係る穀類粒観察装置は、穀類粒を載置する透明底板を備えた試料皿と、この試料皿を載置する透明窓部を上部に備えた装置本体と、この装置本体内に配置され、前記透明窓部、前記試料皿の透明底板を介して前記穀類粒に対し透過用の下部照明光を照射する下部照明手段と、前記装置本体における透明窓部上の試料皿を表出又は包覆可能で、且つ、装置本体を開閉可能に施蓋するとともに、内部に前記試料皿上の穀類粒に対して反射用の上部照明光を照射する上部照明手段を備えた蓋体と、前記蓋体内において、この蓋体の開蓋状態で前記試料皿上の穀類粒の上方に展開可能に配置した拡大光学手段とを有することを特徴とするものである。この発明によれば、請求項1記載の穀類粒観察装置の構成に加えて、前記拡大光学手段を備えているので、例えば米粒等からの透過光の観察、粉類、豆類等からの反射光の観察を、拡大光学手段を使用して一層精密に実行することができる。請求項3記載の発明に係る穀類粒観察装置は、請求項1又は2記載の穀類粒観察装置において、前記下部照明手段による下部照明光、前記上部照明手段による下部照明光を、いずれか一方のみ又は双方同時に、前記試料皿上の穀類粒に照射可能としたことを特徴とするものである。この発明によれば、前記下部照明手段による下部照明光、上部照明手段による下部照明光を、いずれか一方のみ又は双方同時に前記試料皿上の穀類粒に照射して、例えば米粒等からの透過光の観

察、粉類、豆類等からの反射光の観察、更には、米粒等からの透過光及び反射光双方の観察を実行でき、特に米粒等に対する観察能力を向上することができる。

【0005】

【発明の実施の形態】以下に本発明の実施の形態を説明する。図1は、本発明の実施の形態に係る穀類粒観察装置の側面透視図、図2は本発明の実施の形態の穀類粒観察装置の正面図である。本実施の形態に係る穀類粒観察装置は、略直方体状で内部が空洞の装置本体1と、この装置本体1上において、装置本体1の上面領域を、支持軸部3を支軸として開閉する蓋体2とを有している。

【0006】装置本体1の上面には、透明材料からなる透明窓部4が水平状配置に設けられ、蓋体2の底面と接合するようになっている。また、装置本体1の内部は、図1に示すように、前記支持軸部3側から装置本体1の正面側に向かって斜めに傾斜する配置のシート材5により上下分割状態に仕切られている。そして、前記透明窓部4とシート材5の間で、且つ、装置本体1の正面側に片寄った位置に下部照明手段である蛍光灯6を配置している。前記シート材5は透明フィルムにより形成され、裏面に青色シルク印刷が施されており、青色背景を与えるようにして穀類粒の胴割れ等の観察に際して、図4に示すような観察者の観察眼Eの疲労を軽減するようになっている。また、図1に示す装置本体1の内部における左右両隅部には、前記蛍光灯6に点灯用の電力を供給する下部照明用の電池7、8が配置されている。前記透明窓部4上には、図4に示すように、例えば200粒程度の穀類粒が載置可能であり、且つ、底板20aを透明材料で形成した試料皿20を載置するようになっている。

【0007】前記蓋体2は、蓋本体11と、この蓋本体11上に密接配置した上部照明筐体12とを具備している。前記蓋本体11の底面側は前記試料皿20の外周よりも大きい寸法をもって開口されていて、蓋体2により装置本体1を施蓋した時には、前記透明窓部4上の試料皿20は完全に蓋本体11の内部に没入するようになっている。従って、この蓋体2は、蓋体2を装置本体1から開閉することにより、前記装置本体1における透明窓部4上の試料皿20を表出又は包覆可能なようになっている。また、前記蓋本体11における装置本体1の正面側には取手部13が設けられている。更に、前記蓋本体11の内部には、ヒンジ14により一端を図4に示す矢印方向に回動可能に支持されたレンズ支持体15と、このレンズ支持体15により保持された拡大レンズ16とが配置され、この拡大レンズ16を、図1、図4に示すように、前記試料皿20の上方位置に臨ませることが可能となっている。

【0008】拡大レンズ16を保持するレンズ支持体15は、レンズ支持体15の両側縁の基端部付近に設けられた耳部41と蓋体2の先端内側に設けられたバネ取り

付け耳部(図示せず)との間に設けたバネ42により、図5に示すように上昇した位置に保持できるようになっている。この上昇した位置で、拡大レンズ16を、前記試料皿20の上方位置に臨ませることが可能となっている。レンズ支持体15を押し込むと、バネ42のオーバーセンター作用でレンズ支持体15が蓋体2の裏面に近接する休止位置に保持される。

【0009】図5に示すように、蓋体2とガイド板43との間には、左右対称位置に、折り畳み可能な遮光幕44、44が配置されている。この遮光幕44は、蓋体2を閉じた際に折り畳まれ、蓋体2を開いた際にガイド板43のU字状の切欠き部43aの両側に立ち上がり、外光が透明窓部4或いは該透明窓部4上に載置された試料皿20の部分へ入るのを遮光している。前記蓋本体11の上面部には開口部11aが形成され、この開口部11aに前記上部照明筐体12の底面側を画する白アクリル板からなる拡散板17を臨ませている。また、上部照明筐体12の内部には、装置本体1の正面側に位置して上部照明手段である上部蛍光灯18を配置するとともに、その反対側には、図3にも示すように、上部蛍光灯18に点灯用の電力を供給する上部照明用の電池19a、19bを配置している。なお、図示していないが、前記蛍光灯6、上部蛍光灯18を各々点灯操作するための電源スイッチが前記装置本体1に設けられている。

【0010】次に、上述した本実施の形態の穀類粒観察装置の作用を図4をも参照して説明する。まず、蓋体2を支持軸部3を支軸として図4に示す矢印a方向に回動させ、装置本体1の側方に開蓋する。更に、前記レンズ支持体15により保持された拡大レンズ16を、ヒンジ14を支点として回動させ、前記透明窓部4の上方位置に臨ませる。この状態で、穀類粒の一例である例えば米粒30を試料皿20に載せ、図4に示すように、前記透明窓部4上に載置する。次に、装置本体1に設けた電源スイッチを操作し、例えば、前記蛍光灯6を点灯して下部照明光を前記透明窓部4、試料皿20を経て米粒30に斜め下方向から照射する。この下部照明光は、米粒30内を透過し前記拡大レンズ16に至り、これにより、拡大レンズ16を介して観察眼Eに米粒30を透過した光が観察される。この場合に、例えば米粒30に割れがあると暗影が生じるので、この暗影の程度により米粒30の胴割れの程度を判定することが可能となる。前記拡大レンズ16を使用しないで米粒30内を透過した光を直接に観察眼Eにより観察して米粒30の胴割れの程度を判定することも勿論可能である。また、装置本体1に設けた電源スイッチを操作し、例えば、前記上部照明用の上部蛍光灯18だけを点灯して、前記拡散板17を介して拡散光を試料皿20上の例えば米粒30に上方或いは斜め上方から照射し、米粒30からの反射光を前記拡大レンズ16を使用して又は拡大レンズ16を使用しないで直接観察し、米粒30の胴割れの程度等を判定する

ことも勿論可能である。更に、上述した蛍光灯6、上部蛍光灯18の双方を点灯し、下部と、上方或いは斜め上方とからの双方の照明光を併用して、試料皿20上の米粒30からの透過光、反射光を観察することによって米粒30の胴割れの程度等を判定することも勿論可能である。このような本実施の形態に係る穀類粒観察装置によれば、玄米や精米等の米粒を観察できることは勿論、粉類、豆類等のように光が透過しない穀類粒の観察可能であり、しかも、このような本装置は、屋外でも簡単に使用することができる。以上、例えば米粒の胴割れを検出する実施の形態装置を例に挙げて説明したが、本発明は、更に未熟米、被害米、碎米等の検出、或いは混入した異物や害虫の発見にも使用し得る。更にまた、本実施の形態に係る穀類粒観察装置によれば、玄米や精米等の米粒に限らず、粉類、豆類等の透過光の検出が困難な穀類粒全般に対する観察が可能であることは上述した通りである。この他、本発明に係る観察装置は、穀類粒の他に、例えばマイクロマシン等に使用する精密部品、半導体部品等の良否判別、精密機器の組み立て等にも幅広く適用可能である。

【0011】

【発明の効果】以上説明した本発明によれば、以下の効果を奏する。請求項1記載の発明によれば、玄米や精米等の米粒は勿論、粉類、豆類等の様に光が透過しない穀類粒をも観察しその良否を判定することが可能な穀類粒観察装置を提供することができる。請求項2記載の発明によれば、玄米や精米等の米粒等からの透過光の観察、粉類、豆類等からの反射光の観察を、拡大光学手段を使用して一層精密に実行することができる穀類粒観察装置を提供することができる。請求項3記載の発明によれば、前記請求項1又は2の効果に加えて、特に玄米や精米等の米粒等に対する観察能力を向上することができる穀類粒観察装置を提供することができる。

【図面の簡単な説明】

【図1】本発明の実施の形態の穀類粒観察装置の側面透視図である。

【図2】本発明の実施の形態の穀類粒観察装置の正面図

である。

【図3】本発明の実施の形態の穀類粒観察装置の蓋本体及び上部照明筐体を下から見た状態を示す図である。

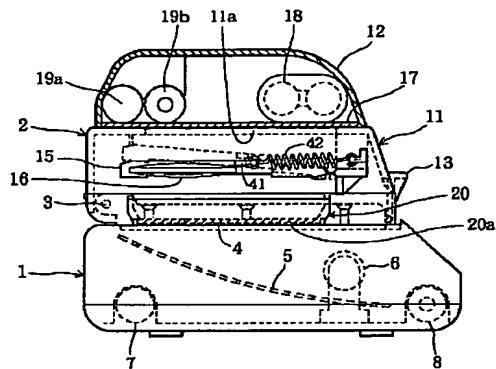
【図4】本発明の実施の形態の穀類粒観察装置の動作説明図である。

【図5】本発明の実施の形態の穀類粒観察装置の使用状態を示す説明図である。

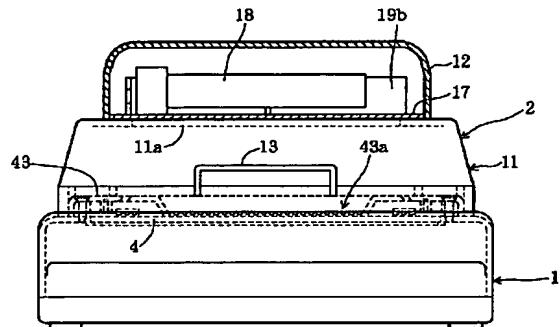
【符号の説明】

1	装置本体
2	蓋本体
3	支持軸部
4	透明窓部
5	シート材
6	蛍光灯
7	電池
8	電池
11	蓋本体
11a	開口部
12	上部照明筐体
20	取手部
14	ヒンジ
15	レンズ支持体
16	拡大レンズ
17	拡散板
18	上部蛍光灯
19a	上部照明用電池
19b	上部照明用電池
20	試料皿
20a	試料皿20の底板
30	米粒
41	耳部
42	バネ
43	ガイド板
43a	切欠き部
44	遮光幕
E	観察者の観察眼

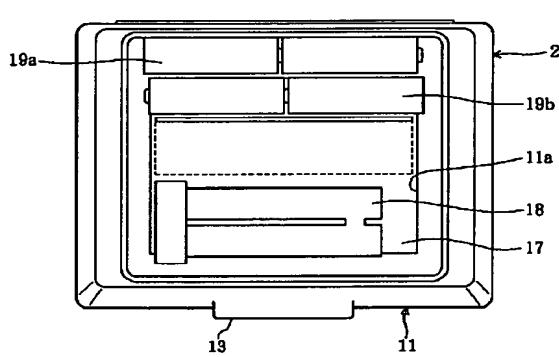
【図1】



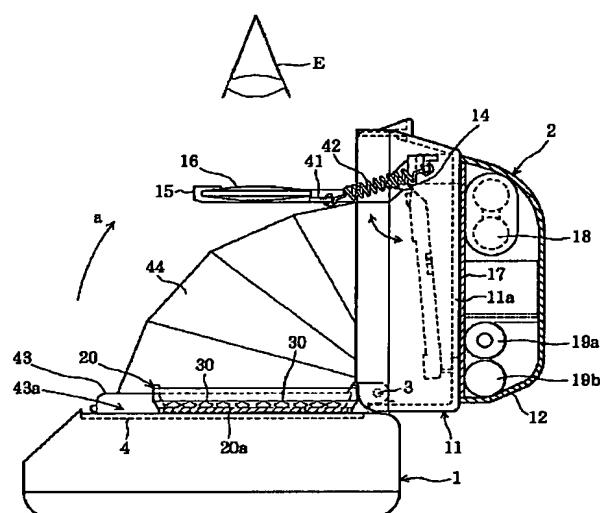
【図2】



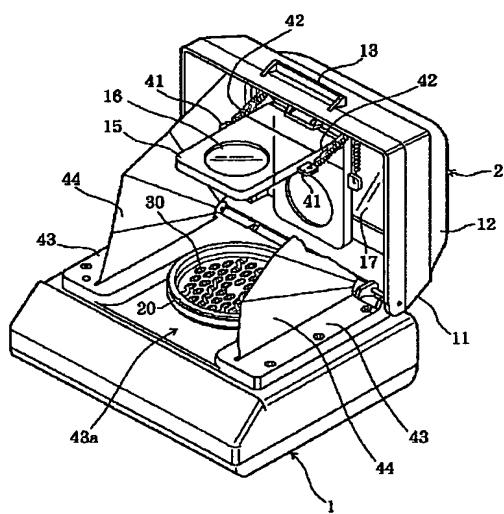
【图3】



[图4]



【図5】



CLAIMS

[Claim(s)]

[Claim 1] Cereals grain observation equipment characterized by providing the following Planchet equipped with the transparency bottom plate which lays a cereals grain The body of equipment which equipped the upper part with the transparency window part which lays this planchet A lower lighting means to be arranged in this body of equipment and to irradiate the lower illumination light for transparency to said cereals grain through said transparency window part and the transparency bottom plate of said planchet The lid which equipped the interior with an up lighting means to irradiate the up illumination light for reflection to the cereals grain on said planchet while lidding the planchet on the transparency window part in said body of equipment possible [closing motion of the body of equipment] possible [expression or ****]

[Claim 2] Planchet equipped with the transparency bottom plate which lays a cereals grain The body of equipment which equipped the upper part with the transparency window part which lays this planchet, and a lower lighting means to be arranged in this body of equipment and to irradiate the lower illumination light for transparency to said cereals grain through said transparency window part and the transparency bottom plate of said planchet, An up lighting means to irradiate the up illumination light for reflection to the cereals grain on said planchet inside while lidding the planchet on the transparency window part in said body of equipment possible [closing motion of the body of equipment] possible [expression or ****] It is cereals grain observation equipment equipped with the above, and is characterized by having the expansion optical means arranged possible [expansion] above the cereals grain on said planchet in the state of opening of this lid.

[Claim 3] Cereals grain observation equipment according to claim 1 or 2 characterized by only either enabling the exposure of the lower illumination light by said lower lighting means, and the up illumination light by said up lighting means to the cereals grain on said planchet at both coincidence.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the cereals grain observation equipment which made the drum crack etc. detectable from the black spot which carries out light transmission of the light to cereals grains, such as a grain of rice, and is seen in a cereals grain about cereals grain observation equipment.

[0002]

[Description of the Prior Art] It is requested that the drum crack of cereals grains, such as a grain of rice, should discover and eliminate the cereals grain which is the falling factor and carried out the drum crack of the quality of cereals. For this reason, also in the former, arrange a cereals grain in much bore sections, light is made to penetrate, and the

method of discovering the cereals grain which inspected and carried out the drum crack of the existence of the black spot in a cereals grain is adopted.

[0003]

[Problem(s) to be Solved by the Invention] since [however,] it is what observes the transmitted light of a cereals grain in the case of the conventional example mentioned above -- for example, unhulled rice -- the condition of the cereals grain which light does not penetrate like a kind and legumes was unobservable. then, the thing for which this invention can observe grains of rice, such as brown rice and rice cleaning, -- of course -- unhulled rice -- the cereals grain which light does not penetrate like a kind and legumes can also be observed, the quality can be judged, and it aims at offering the cereals grain observation equipment which can be used also outdoors easily.

[0004]

[Means for Solving the Problem] The cereals grain observation equipment concerning invention according to claim 1 The planchet equipped with the transparency bottom plate which lays a cereals grain, and the body of equipment which equipped the upper part with the transparency window part which lays this planchet, Expression or **** is possible in the planchet on a lower lighting means to be arranged in this body of equipment and to irradiate the lower illumination light for transparency to said cereals grain through said transparency window part and the transparency bottom plate of said planchet, and the transparency window part in said body of equipment. And while lidding possible [closing motion of the body of equipment], it is characterized by having the lid which equipped the interior with an up lighting means to irradiate the up illumination light for reflection to the cereals grain on said planchet. According to this invention, with a lower lighting means to irradiate the lower illumination light for transparency, to the cereals grain on planchet Since it has an up lighting means to irradiate the up illumination light for reflection to said cereals grain the both sides of observation of the transmitted light from the grain of rice which uses a lower lighting means, and observation of the transmitted light from the grain of rice which uses an up lighting means -- it can perform -- a grain of rice -- of course -- unhulled rice -- it becomes possible to also observe the cereals grain which light does not penetrate like a kind and legumes, and to judge the quality. The cereals grain observation equipment concerning invention according to claim 2 The planchet equipped with the transparency bottom plate which lays a cereals grain, and the body of equipment which equipped the upper part with the transparency window part which lays this planchet, Expression or **** is possible in the planchet on a lower lighting means to be arranged in this body of equipment and to irradiate the lower illumination light for transparency to said cereals grain through said transparency window part and the transparency bottom plate of said planchet, and the transparency window part in said body of equipment. And while lidding possible [closing motion of the body of equipment], it sets in the lid which equipped the interior with an up lighting means to irradiate the up illumination light for reflection to the cereals grain on said planchet, and said lid. It is characterized by having the expansion optical means arranged possible [expansion] above the cereals grain on said planchet in the state of opening of this lid. according to this invention -- the configuration of cereals grain observation equipment according to claim 1 -- in addition -- since it has said expansion optical means -- observation of the transmitted light from a grain of rice etc., and unhulled rice -- observation of the reflected light from a kind, legumes, etc. can be further performed to a

precision using an expansion optical means. The cereals grain observation equipment concerning invention according to claim 3 is characterized by only either enabling the exposure of the lower illumination light by said lower lighting means, and the lower illumination light by said up lighting means to the cereals grain on said planchet at both coincidence in cereals grain observation equipment according to claim 1 or 2. the lower illumination light [according to this invention] by said lower lighting means, and the lower illumination light by the up lighting means -- either -- or both coincidence -- the cereals grain on said planchet -- irradiating -- for example, observation of the transmitted light from a grain of rice etc. and unhulled rice -- observation of the reflected light from a kind, legumes, etc. and especially as opposed to [can perform observation of both the transmitted light from a grain of rice etc. and the reflected light further, and] grain of rice etc. observation capacity can be improved.

[0005]

[Embodiment of the Invention] The gestalt of operation of this invention is explained below. The side-face perspective drawing of the cereals grain observation equipment which drawing 1 requires for the gestalt of operation of this invention, and drawing 2 are the front views of the cereals grain observation equipment of the gestalt of operation of this invention. As for the cereals grain observation equipment concerning the gestalt of this operation, the interior has the body 1 of equipment of a cavity, and the lid 2 open and close the support shank 3 for the top-face field of the body 1 of equipment as a pivot on this body 1 of equipment by the shape of an abbreviation rectangular parallelepiped.

[0006] The transparence window part 4 which consists of a transparent material is formed in horizontal-like arrangement, and joins to the base of a lid 2 on the top face of the body 1 of equipment. Moreover, the interior of the body 1 of equipment is divided into the vertical division condition by the web material 5 of the arrangement which inclines aslant toward the transverse-plane side of the body 1 of equipment from said support shank 3 side as shown in drawing 1. And the fluorescent lamp 6 which is a lower lighting means is arranged in the location which is between said transparence window parts 4 and web materials 5, and inclined toward the transverse-plane side of the body 1 of equipment. It is formed of a bright film, blue silk printing is performed to the rear face, and said web material 5 mitigates fatigue of the observing eye E of an observer as can give a blue background and shows drawing 4 on the occasion of observation of the drum crack of a cereals grain etc. Moreover, the cells 7 and 8 for lower lighting which supply the power for lighting to said fluorescent lamp 6 are arranged in right-and-left both the corners in the interior of the body 1 of equipment shown in drawing 1. On said transparence window part 4, as shown in drawing 4, the planchet 20 which could lay about 200 grains of cereals grains, and formed bottom plate 20a by the transparent material is laid.

[0007] Said lid 2 possesses the body 11 of a lid, and the up lighting case 12 which carried out close arrangement on this body 11 of a lid. When opening of the base side of said body 11 of a lid is carried out with the larger dimension than the periphery of said planchet 20 and the body 1 of equipment is lidded with a lid 2, the planchet 20 on said transparence window part 4 is completely absorbed in the interior of the body 11 of a lid. Therefore, by opening and closing a lid 2 from the body 1 of equipment, expression or **** is possible for this lid 2, and it has come the planchet 20 on the transparence window part 4 in said body 1 of equipment. Moreover, the Toride section 13 is formed in the transverse-plane side of the body 1 of equipment in said body 11 of a lid.

Furthermore, inside said body 11 of a lid, it is possible to make the upper part location of said planchet 20 face this magnifying lens 16, as the lens base material 15 supported rotatable in the direction of an arrow head which shows an end to drawing 4 with a hinge 14, and the magnifying lens 16 held by this lens base material 15 are arranged and it is shown in drawing 1 and drawing 4.

[0008] The lens base material 15 holding a magnifying lens 16 can be held now in the location which rose with the spring 42 prepared between the handle part 41 prepared near the end face section of the edges on both sides of the lens base material 15, and the spring installation handle part (not shown) prepared inside [tip] the lid 2 as shown in drawing 5. It is possible to make the upper part location of said planchet 20 face a magnifying lens 16 in the location besides staged. If the lens base material 15 is pushed in, the lens base material 15 will be held in an overcenter operation of a spring 42 in the position of rest close to the rear face of a lid 2.

[0009] As shown in drawing 5, between the lid 2 and the guide plate 43, the foldable shades 44 and 44 are arranged in the bilateral symmetry location. When this shade 44 closes a lid 2, it is folded up, when it opens a lid 2, it starts on both sides of notch 43a of the shape of U character of a guide plate 43, and it is shading going into the part of the planchet 20 by which outdoor daylight was laid on the transparency window part 4 or this transparency window part 4. Opening 11a is formed in the top-face section of said body 11 of a lid, and the diffusion plate 17 which consists of a white acrylic board which draws the base side of said up lighting case 12 to this opening 11a is made to face. Moreover, while being located in the transverse-plane side of the body 1 of equipment and arranging the up fluorescent lamp 18 which is an up lighting means inside the up lighting case 12, as shown also in drawing 3, the cells 19a and 19b for up lighting which supply the power for lighting are arranged to the up fluorescent lamp 18 in the opposite side. In addition, although not illustrated, the electric power switch for carrying out lighting actuation of said fluorescent lamp 6 and the up fluorescent lamp 18 respectively is prepared in said body 1 of equipment.

[0010] Next, an operation of the cereals grain observation equipment of the gestalt of this operation mentioned above is explained also with reference to drawing 4. First, a lid 2 is rotated in the direction of arrow-head a shown in drawing 4 by using the support shank 3 as a pivot, and it opens to the side of the body 1 of equipment. Furthermore, a hinge 14 is rotated as the supporting point and the upper part location of said transparency window part 4 is made to face the magnifying lens 16 held by said lens base material 15. In this condition, the grain of rice 30 which is a kind of a cereals grain is put on planchet 20, and as shown in drawing 4, it lays on said transparency window part 4. Next, the electric power switch prepared in the body 1 of equipment is operated, for example, said fluorescent lamp 6 is turned on, and the lower illumination light is irradiated from slanting down one through said transparency window part 4 and planchet 20 at a grain of rice 30. This lower illumination light penetrates the inside of a grain of rice 30, and results in said magnifying lens 16, and, thereby, the light which penetrated the grain of rice 30 to the observing eye E through the magnifying lens 16 is observed. In this case, since the black spot arises that a crack is in a grain of rice 30, for example, it becomes possible to judge extent of the drum crack of a grain of rice 30 with extent of this black spot. Of course, it is also possible to observe directly the light which penetrated the inside of a grain of rice 30 without using said magnifying lens 16 by the observing eye E, and to

judge extent of the drum crack of a grain of rice 30. Moreover, operate the electric power switch prepared in the body 1 of equipment, for example, only the up fluorescent lamp 18 for said up lighting is turned on. Of course, it is also possible to irradiate the diffused light from the upper part or the slanting upper part through said diffusion plate 17 at the grain of rice 30 on planchet 20, to carry out direct observation of the reflected light from a grain of rice 30 without using a magnifying lens 16, using said magnifying lens 16, and to judge extent of the drum crack of a grain of rice 30 etc. Furthermore, of course, it is also possible to turn on the both sides of the fluorescent lamp 6 mentioned above and the up fluorescent lamp 18, to use together the illumination light of the both sides from the lower part, and the upper part or the slanting upper part, and to judge extent of the drum crack of a grain of rice 30 etc. by observing the transmitted light from the grain of rice 30 on planchet 20 and the reflected light. according to the cereals grain observation equipment concerning the gestalt of such this operation, grains of rice, such as brown rice and rice cleaning, are observable -- of course -- unhulled rice -- observation of the cereals grain which light does not penetrate like a kind and legumes is possible, and, moreover, also outdoors, such this equipment can be used easily. As mentioned above, although the gestalt equipment of the operation which detects the drum crack of a grain of rice, for example was mentioned as the example and explained, this invention is further applicable also to discovery of foreign matters detected or mixed, such as unripe rice and damage rice and crushed rice, or a noxious insect. furthermore -- according to the cereals grain observation equipment applied to the gestalt of this operation again -- not only grains of rice, such as brown rice and rice cleaning, but unhulled rice -- it is as having mentioned above for the observation to a cereals grain at large [with difficult detection of the transmitted lights, such as a kind and legumes,] to be possible. In addition, the observation equipment concerning this invention is broadly applicable to the assembly of quality distinction of the precision components used for a micro machine etc. other than a cereals grain, semi-conductor components, etc., and a precision mechanical equipment etc.

[0011]

[Effect of the Invention] According to this invention explained above, the following effectiveness is done so. according to invention according to claim 1 -- grains of rice, such as brown rice and rice cleaning, -- of course -- unhulled rice -- the cereals grain observation equipment which the cereals grain which light does not penetrate like a kind and legumes is also observed, and can judge the quality can be offered. according to invention according to claim 2 -- observation of the transmitted light from grains of rice, such as brown rice and rice cleaning, etc., and unhulled rice -- the cereals grain observation equipment which can perform observation of the reflected light from a kind, legumes, etc. to a precision further using an expansion optical means can be offered. According to invention according to claim 3, in addition to said claim 1 or the effectiveness of 2, the cereals grain observation equipment which can improve the observation capacity over grains of rice, such as brown rice and rice cleaning, etc. especially can be offered.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the side-face perspective drawing of the cereals grain observation equipment of the gestalt of operation of this invention.

[Drawing 2] It is the front view of the cereals grain observation equipment of the gestalt of operation of this invention.

[Drawing 3] It is drawing showing the condition of having seen the body of a lid and up lighting case of cereals grain observation equipment of operation of this invention from the bottom. [of a gestalt]

[Drawing 4] It is the explanatory view of the cereals grain observation equipment of the gestalt of operation of this invention of operation.

[Drawing 5] It is the explanatory view showing the busy condition of the cereals grain observation equipment of the gestalt of operation of this invention.

[Description of Notations]

- 1 Body of Equipment
- 2 Lid
- 3 Support Shank
- 4 Transparency Window Part
- 5 Web Material
- 6 Fluorescent Lamp
- 7 Cell
- 8 Cell
- 11 Body of Lid
- 11a Opening
- 12 Up Lighting Case
- 13 Toride Section
- 14 Hinge
- 15 Lens Base Material
- 16 Magnifying Lens
- 17 Diffusion Plate
- 18 Up Fluorescent Lamp
- 19a The cell for up lighting
- 19b The cell for up lighting
- 20 Planchet
- 20a The bottom plate of planchet 20
- 30 Grain of Rice
- 41 Handle Part
- 42 Spring
- 43 Guide Plate
- 43a Notch
- 44 Shade
- E An observer's observing eye